A Survey of the Semiblind School Children in the City of Philadelphia

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A SURVEY OF THE SEMIBLIND SCHOOL CHILDREN IN THE CITY OF PHILADELPHIA*

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It may be desirable to begin this paper with the motives that prompted the survey, and a statement of reasons for submitting the results before this Section. While similar conditions exist in many states, the facts offered refer chiefly to our own State of Pennsylvania.

By acts of Legislature, education is compulsory between the ages of six and sixteen years. There is, however, a small percentage of child population which, because of mental or physical incapacity, is unable to reap the benefits of the splendid opportunities offered in the public schools. The law does not relieve any child from school attendance unless it has been definitely proved to be unteachable and untrainable. These exceptions are chiefly children who are suitable for institutions. Many mental and physical defects exist that incapacitate children from acquiring education by our ordinary school methods but still permit them to be taught and trained by specialized methods.

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In the State of Pennsylvania, an act of July 22, 1919, imposes certain and special duties upon the educational administrators. It is the duty of these educators to formulate plans for the proper and safe education of these handicapped children. The problem is met by special classes, curricula, and teachers. The crippled children are transported in busses, and their capabilities met; the deaf children are segregated, and the sense of vision and touch are utilized to replace lost hearing; the cardiac, malnourished, tuberculous, and those with defective speech each receive special educational facilities. The children who are incapacitated because of semiblindness are similarly offered special education in what are commonly termed "sight-saving" or "conservation-of-vision" classes. These demand special equipment and specially qualified teachers.

The use of the term "semiblind" here refers to those children whose visual acuity is so low and uncorrectible, or the physical condition of whose visual organs is so defective as to render it unsafe to use them in ordinary school methods. The totally blind child is amply cared for in institutions established by the State. The child not blind enough to be eligible for an institution, yet who has insufficient vision to progress in the regular classes of a public-school system is the type included in the provisions of the law.

Divers standards of semiblindness have been adopted by the various cities and states. Philadelphia accepts as eligible for admission to sight-

saving classes those who have a visual acuity of 15/70 or less, permitting the use of both eyes and employment of the best possible correcting lenses; also cases of a high degree of myopia and other pathologic eye conditions that are progressive and destructive.

Effectively to meet the requirements of the law, the following measures must be carried out: (1) The detection of all serious eye defects. (2) The correct diagnosis, recommendation, and treatment. (3) The organization and proper conduct of special classes for conserving vision.

A more or less effectual sifting of cases is accomplished by the highly organized systems of school medical inspection, but the only completely effective method is by the services of ophthalmologists. The school physicians have determined with fair accuracy the percentage of uncorrected cases of defective vision existing in a school population. It is, however, beyond their limited skill in the diagnosis of eye defects to determine accurately the number of cases of uncorrectible visual defects.

The ophthalmologist will sooner or later be called upon to offer his expert opinion and assistance on the following problems: (1) The extent of disability among school children, due to pathologic eye conditions. (2) The uniform standards on kind and degree of eye defects which should be adopted for admission to special classes. (3) The devising of educational methods and equipment suitable for training such children.

(4) The preparation of practical lessons on hygiene of the eye that may minimize dangers and preserve vision. (5) The medical examinations and supervision of the children who are enrolled in sight-saving classes. (6) The preparation and direction of semiblind children into useful vocations which offer the least danger to visual safety.

No large city has previously endeavored to answer the above problems. This survey was an endeavor to determine accurately and fully the number and kind of serious eye defects in the school population of Philadelphia, to find all potential cases requiring placement in "sight-saving classes," and also to urge treatment where visual acuity could be improved by lenses or other remedial measures.

Methods of Procedure

Philadelphia has an enrollment in the elementary schools of approximately 210,000. In order to discover every child having a visual acuity of 15/70 or less, permitting the use of correcting glasses when worn, a threefold selective process was adopted. The visual acuity of each child had been recorded by the medical inspectors in routine physical examinations. Lists prepared from these school records showed that about 4,000 children possessed vision of 15/50 or less. The names of each of these poor-vision patients were submitted to the ten district medical supervisors. They reëxamined the 4,000 children to furnish corrected lists containing the

names of those having a visual acuity of 15/70 or less. This check-up gave a list of 1,000 children scattered throughout the city. The object of checking those with vision of 15/50 was to catch all of the borderline cases.

A report was sent to me of every school in Philadelphia. These lists comprised, for each case, name, age, grade, sex, color, visual acuity with or without glasses and such medical data that may aid in diagnosis and recommendation. Each school was visited by me and the reported cases carefully examined. After discarding a number of cases for various reasons, and because some had better vision than recorded, there remained 750 children who required an intensive and careful examination. The results of these examinations are the basis of this report.

A special portable equipment offered all the needed facilities for the work. A portable dark room was devised from three-foot lengths of gas pipe. Over this frame work was thrown a black and opaque material that covered top and sides, but left one side for an entrance. This tent gave a dark room 3 feet wide, 6 feet high, and 6 feet deep, and folded into a very small portable package. An electric ophthalmoscope and retinoscope, a portable lamp, a small case of test lenses and several of the smaller instruments needed in office work completed the outfit. The tent was used only in schools where a closet or room suited for dark-room purposes was not available.

Each of the 750 seemingly semiblind children was carefully examined with an ophthalmoscope and with retinoscope and trial lenses, and a preliminary refraction was made. With the exception of 84 children, all could be given useful or normal vision, and showed no gross pathologic conditions. While a few required added and medical treatment, all could be corrected by means of refraction and use of lenses of moderate strength.

While but 49 of the cases were suitable for admission to sight-saving classes, we may include the entire 84 in estimating the total semiblind in the school population. With 171 pupils previously enrolled in such classes, the ratio of visually incapacitated children to school population would be one to each thousand.

Ophthalmologists are frequently consulted not only on the treatment of semiblind school children but also regarding their education. Parents desire to know if the regular or ordinary school methods may be detrimental to the child's eyes. Where conservation-of-vision classes exist, the specialist should know the requirements for admission and the methods of conducting the classes. In the United States there are 264 sight-saving classes, distributed in 77 cities and 19 states. Unfortunately, neither the requirements for admission, nor the conduct of conservation-of-vision classes are uniform. Before advising parents in reference to the education, the physician should give the child the best possible vision

with safety in use of the eyes. These children usually fail to progress by ordinary school methods and equipment. Special education conserves the already failing vision, emphasizes the need of proper hygiene of the visual organs, and guides as well as prepares the semiblind for proper and useful vocations.

An analysis of the 675 cases that could be given useful vision is interesting. With the exception of 67 requiring compound hyperopic and 21 mixed astigmatic lenses, practically all of the cases were myopic. The majority of the myopes required from two to four diopters to correct. In 42 cases one or more diopters of minus cylinder was also needed. Sixty children had a vision of 15/70 or less with the use of glasses they were wearing. Of these, 37 were myopes undercorrected and requiring more minus sphere and cylinder; ten required the addition of plus cylinder; eight were overcorrected hyperopes; and five were wearing plus where they needed minus lenses.

It may be evident that the large ratio of myopes reported in this survey is not the normal ratio in ametropia among children. The reason for the seeming discrepancy is due to diagnosing the cases by taking visual acuity on the Snellen chart. Hyperopia, unless combined with considerable astigmatism, causes little interference with vision. It takes about four diopters of hyperopia to reduce vision noticeably in a child.

Three diopters of myopia generally reduces vision to 15/70.

An analysis of 326 refractions in a school clinic may furnish a more correct idea of the ratio of the various refractive errors:

Simple hyperopia	141
Simple myopia	45
Compound hyperopic astigmatism	69
Compound myopic astigmatism	28
Hyperopic astigmatism	15
Myopic astigmatism	8
Mixed astigmatism	20

Ten cases of malingering were found. These required considerable time and effort to detect. The reasons for malingering may make an interesting psychologic study.

An analysis of the 74 cases in which vision could not be improved or serious pathologic conditions existed follows:

ANALYSIS OF 49 CASES RECOMMENDED FOR SIGHT-SAVING CLASSES*

Corneal opacities	11
High myopia	9
Compound hyperopic astigmatism with choroidal changes	4
Mixed astigmatism with choroidal changes	1
Retinochoroiditis	4

*The forty-nine cases recommended for sight-saving classes were chiefly corneal opacities, high myopia, and various congenital defects, including cataracts. The ten cases pending decision were held up because there seemed a possibility of improving vision considerably. Twenty-five children, though semiblind, were refused enrollment in sight-saving classes because mentality was extremely poor or extremely good. The extremely poor mentality and vision were associated with signs of associated central lesions. In the extremely good mentality the children had reached the higher grades in school and progressed without seeming harm to their eyes.

Amaurosis with nystagmus	7
Albinism with nystagmus	3
Congenital cataracts	7
Cataracts and corneal opacities	1
Coloboma of iris and choroid	1
Coloboma of choroid	1
Total	49

CASES PENDING DECISION

Potential Cases for Sight-Saving Classes

Optic atrophy	1
Amaurosis with nystagmus	4
Albinism with nystagmus	3
Compound hyperopic astigmatism	2
Total	10

TWENTY-FIVE CHILDREN NOT SUITED FOR PLACEMENT IN SIGHT-SAVING CLASSES

Mentality Very Poor

Amaurosis with nystagmus	4
High hyperopic astigmatism	1
Central lesion, restricted visual fields	1
Central lesion and spastic paraplegia	1
Central lesion and infantile paralysis	1
Total	8

Mentality Very Good

Pupils in higher grades and progressing in regular classes without harm to eyes:

High myopia	8
Corneal opacities	5
Albinism with hyperopia	3
Congenital cataracts (operated)	1
Total	17

The above classification based on mentality is made for the administration and the proper conduct of the classes. When mentality is very low with the added handicap of little vision, the child fails in obtaining an education and holds back the other pupils. Good mentality and progress in class is no logical reason for keeping a child out of sight-saving class unless there is assurance by the ophthalmologist that the regular class work is not detrimental to vision.

A detailed study of the existence of more than one child in the same family afflicted with markedly pathologic eye conditions was difficult because children from one family attended different schools. It was frequently noted, however, that there would be two or more myopes in the same family. Two brothers, aged 11 and 13, were afflicted with amaurosis and nystagmus, and had vision of 15/100. The mentality in the younger child was poor, but normal in the older. Three sisters, albinos with nystagmus, had high compound hyperopic astigmatism and vision about 20/200. These girls had excellent mentality, and progressed in school even though visually handicapped. They were in the normal grades for their ages; one reached the sixth, and another the eighth grade. Although vision in each case with correcting lenses was 20/100, there remained a useful near vision. This, together with good mentality, enabled them to keep up with their more fortunate classmates. The school progress of these children without

any apparent harm to their visual organs warranted a decision to permit them to remain in regular classes.

Another interesting case of heredity appeared in a family of five children, four girls and one boy, ages 18, 14, 12, 9, and 3. Two of the girls, aged 12 and 14 years, have congenital cataracts of both eyes. In each case after several operations the vision remained 15/100 in each eye. A brother, three years old and not attending school, is likewise afflicted, but has not as yet been operated upon. Two sisters, one aged 9 years, attending school and one aged 18 years, now employed, have normal vision. The mentality of each member of this group is good. The two with cataracts were below grade in school due only to the physical handicap of poor vision. They were recommended for enrollment in sight-saving classes. They had not been placed previously because they came from New York State to Philadelphia about two months before. The school physician had as yet not examined them.

Few cases of poor vision with existing acute conditions were referred to me in this survey. Such cases are quickly detected by the teachers and referred to the visiting physicians. They are immediately sent home with a recommendation for treatment. The cases included in this survey are of congenital origin or the after-effects of disease.

Two patients had an interstitial keratitis of

both eyes. The condition was active, and vision was reduced to 20/200. In both cases there was associated deafness, with hearing reduced to whispered voice at five feet. In both cases there was a four-plus Wassermann. These children were temporarily excused from school for treatment. The decision on whether to place such cases in a "sight-saving class" or "deaf class" depends on which defect clears up first. Generally the vision improves some time before the hearing, and temporary enrollment in a deaf class may soon be followed by restoration to regular class.

Because of the limited number of sight-saving classes and their dispersion in widely separated sections of the city, some children were required to travel distances. No bus transportation is furnished, but carfare is allowed, and in a few cases an older child is employed as escort. With present-day traffic congestion, there is added danger to very young children with very poor vision who are required to travel a distance to attend school. Five children aged six and seven years were withheld from enrollment, although the conditions of their eyes made them eligible.

One of the facts for emphasis in this study is the existence of about 4,000 children with visual acuity of 15/50 or less with no endeavor on the part of the parents to seek treatment. The laws of the State make it mandatory for every child to receive each year a physical examination, including the eyes. In accord with this law, the

school physicians diagnose and recommend for treatment, and the school nurses plead with the parents for action.

The finding of but 84 semiblind children additional to 171 enrolled in sight-saving classes in a school population of over 200,000 is a commendation for the careful and thorough work performed by the school physicians. During the school year ending June 30, 1926, the medical inspectors reported and recommended for treatment 22,800 cases of defective vision; there were also found 1,900 cases of strabismus and 30 cases of keratitis. During the school year ending June 30, 1927, 21,099 cases of defective vision, 1,815 cases of strabismus, and 10 cases of keratitis were diagnosed.

There is, however, no practical means of compelling parents to furnish the needed medical care. It is difficult to decide whether legislative action or educational campaigns to instill a realization of the dangers of uncorrected visual defects is the better procedure. I believe there never was a better opportunity than now to educate the public on eye hygiene.

Conservation of vision arrives at a rather late stage with the establishment of conservation-of-vision classes composed of semiblind children. Conservation should reach the child who needs correcting lenses or other treatment. It should also require the safest lighting of schoolrooms and the furnishing of material for writing and reading that admit the minimum amount of eye-

strain. The improvement in school structures and equipment in the past five years has been most gratifying, but there still remain in some cities many examples of schoolrooms detrimental to vision.

In many of the large cities the educational authorities furnish more or less treatments in a few of the specialties. These free services are limited to those cases where the parents are too poor to pay. The need for furnishing free medical services by city or state departments has often been questioned. I believe the purpose of school medical inspection is amply met when the authorities furnish the best possible hygienic surroundings, protect against communicable diseases, render first aid, and recommend treatment after careful and complete physical examinations. The establishing of school eye clinics was found necessary in many large cities because the hospital clinics were inadequate to meet the demands of a large school population. I believe the establishing of special clinic hours for school children in addition to the regular service of hospital dispensaries would meet the needs in most cases.

The majority of treated defective-vision patients among school children apply for service at hospital dispensaries. No better refraction has ever been done than at present, but some poor work mingles with the good. It is not always due to lack of knowledge or technic, but may be owing to carelessness. This is sometimes

noted from men from whom only the best work is expected. Of the sixty children wearing glasses that seemingly pointed to gross errors in refraction, one-half were treated at clinics or by private physicians and the other half by optometrists. We can forgive the optometrist for his shortcomings, as he lacks the knowledge and expert training to treat the unusual and complicated cases.

In practically all of the sixty cases refraction was done without use of a mydriatic. I do not mean to infer that failure to use a mydriatic interferes with obtaining best results. The need and kind of mydriatic depends on the character of the case and the skill of the examiner. I do believe, however, that gross defects in children are more correctly treated with a mydriatic, preferably atropin.

Another shortcoming frequently noted was the absolute dependence on retinoscopy without checking up by trying the patients before test cards during and after mydriasis. The additional time and effort required is well repaid. To ignore the subjective opinions of children when they claim symptoms or lack of vision with lenses that we choose by retinoscopy is a grave mistake. Many cases of refusal of children to wear prescribed glasses are due to errors in refraction and not negligence and stubbornness of the child. The need of assistants to perform refractions in clinics is evident, but some method of checking

up by the chiefs of clinics, especially in complex cases, should be followed.

Many children handicapped with a marked loss of vision were questioned on the reason for failure to wear correcting glasses. The most frequent answer was that their "parents object" because glasses spoil the child's appearance or the child may break the glasses, and several variations in excuses. Objection on the part of the child was seldom voiced. Belief in Christian Science and other cults was given as an excuse in a number of instances. The extent of ignorance of the value of good vision emphasized the need of a practical education, with convincing lessons on some essentials of hygiene.

Previous to the survey for locating and studying the semiblind children throughout the city, an exhaustive examination was made of each of the pupils already enrolled in sight-saving classes. Philadelphia had 171 children attending thirteen classes distributed in various sections of the city. Several months were spent in studying these cases, as a result of which the following report and analysis is submitted.

Upon visiting a classroom, each child enrolled was given a preliminary examination. Those cases requiring a mydriatic for further study or refraction received such treatment from the school nurse. The following day these children were again examined for diagnosis, refraction, and recommendation.

The results of the work, aside from furnishing

complete records for filing in the school and data for constructive work, permitted the return to regular classes of eighteen of the children attending these special classes. Those returned included corneal opacities 9, myopes 6, and hyperopes 3. These cases were refracted and given useful vision, and the condition of the eyes was considered safe for the performance of ordinary school work in regular classes. To assure that there should be no relapse in the health of the eyes, instructions were given to watch and follow up these children in regular classes.

By means of careful refraction and a consequent change of lenses, a number of the pupils were given a greater amount of visual acuity and improved efficiency. Several of these were listed as borderline cases for later consideration of change to regular classes. Among these cases several were afflicted with corneal opacities, and their records showed repeated refractions with the statement "Cannot improve vision with glasses." The reason for calling attention to these facts is to emphasize the necessity not only of expert treatment but of patient and persistent effort to improve the vision with lenses in all cases. Another outstanding fact is the frequent change in appearance and visual acuity of some corneal cases, either with or without treatment. This makes it unwise to dismiss the opacity cases with a prognosis of permanent semiblindness.

Of the 171 children enrolled in sight-saving

classes there was a slight excess in the number of boys in proportion to girls: male 94, female 77. There were 127 white children and 44 colored. When you consider that about ten per cent of the total school population is colored, the 25 per cent of colored children in sight-saving classes becomes proportionately increased. A glance at the table of diagnoses arranged accord-

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DIAGNOSES OF 171 CASES ENROLLED IN SIGHT-SAVING CLASSES

	White	*Colored*	*Total*
Myopia	48	11	59
Hyperopia	8	2	10
Corneal opacities	31	25	56
Retinochoroiditis	8	3	11
Congenital amaurosis with nystagmus	15	0	15
Congenital cataract	10	2	12
Optic atrophy	5	1	6
Coloboma of iris and choroid	1	0	1
Pseudoglioma	1	0	1
Total	127	44	171

GROUPING ACCORDING TO SEX AND COLOR

Male	94
Female	77
White	127
Colored	44

GROUPING ACCORDING TO APPROXIMATE AGES

No. of cases	5	2	6	24	23	37	33	18	11	12
Age in years	7	8	9	10	11	12	13	14	15	16

ing to the number of each defect in both races shows that 56, or one-third of all cases, were due to corneal opacities, and 25 of the cases were among the colored race. This is 57 per cent of the total cases found in this race. This fact has an important constructive value for salvaging children from the semiblind classes. Tuberculosis and syphilis are frequently found in the colored race, and are also common causes for interstitial keratitis and the resulting corneal opacities. Results from active treatment are often good. All children with keratitis and its sequelæ should be examined with tuberculin and Wassermann tests, and treatment recommended accordingly.

Since corneal opacities suggest injuries as a causative factor, inquiry revealed that but seven children in all classes were enrolled as a result of injuries. Six had corneal opacities, and one had optic atrophy of both eyes. This does not take into account the children who lost part or all vision in one eye following injuries. The other eye having good vision makes the child ineligible for sight-saving class.

Fifty-nine of the total number of children visually incapacitated were the result of high degrees of myopia. In these cases we were unable to obtain useful vision with correcting lenses, or the pathology noted in the fundi made it seem unsafe to continue school work by routine methods. Practically all of these children fail

to progress in class, and frequently remain two or more terms in the same grade.

It may seem strange that the term "progressive myopia" has not been used in the above study. I believe that such a diagnosis should be reserved for those cases of myopia that have been observed over a period of years and a progression noted. I believe with others that the natural trend of myopia among children is towards a moderate increase, but I also believe that it is often possible to keep the amount stationary or even reduce it by frequent careful refractions. It seems to me that we are lacking in a definite standard for determining when myopia is progressive. There seems to be an endeavor by some to term progressive, and a suitable case for sight conservation, every case that requires a high degree of minus lens. Little attention or credit is here given to pathologic changes of the eyes and the amount of visual acuity. There are many men and women in the industrial world wearing high myopic lenses who seem very little incapacitated. Such cases followed in our practice often show no harmful effects to their visual organs. We should be very conservative in limiting the activities of an individual on the mere presence of a high myopia, even though vision is partly lacking. This consideration is more important in childhood when an ambitious child is contemplating a career.

Analysis of Refraction in 59 Cases of Myopia

Table showing the number of diopters required to give the best possible correction and greatest visual acuity:

Right Eye		Left Eye	
Sphere	*Cylinder*	*Sphere*	*Cylinder*
8	4	8	4
7	.	7	.
4	2	4	3
12	3	12	2
12	5	12	2
10	2	9	3
6	1	5	2
4	3	5	2
8	.	10	.
5	1	4	1.50
12	.	8	.
7	4	7	4
10	.	10	.
4.50	1.50	4	1.50
8	.	1	4.50
8	.	10	.
15	.	15	.
6	1	11	.
18	.	10	.
5.50	.	6	1
12	.	12	.
8	.	9	.
7	.	7.50	.
6	2	6	1
5	2	5	2
10	3	13	3
9	.	4.50	1
9	.	9	.
12	3	12	3
10	.	8	2
17	.	17	.

Right Eye		Left Eye	
Sphere	*Cylinder*	*Sphere*	*Cylinder*
8	1	12	3
9	1	5	3
9	2	9	2
7	2	7	3
10	4	10	4
3	2.50	5	2.50
12	.	12	.
12	.	12	.
9	.	9	.
8.50	.	9	.
10	.	10	.
7	2.50	7	3
12	.	12	.
14	.	14	.
8	4	8	5
8	2	11	2
8	3	1	3
13	.	13	.
10	2	7	3
8	2	8	1
6	.	6	.
6	1	7	.
7	.	10	.
12	.	12	.
4	1.50	5.50	.
10	.	10	.
12	.	14	.
6	.	5	.

Simplified Analysis of the Myopia Cases

Showing the total number in each group according to the total number of diopters (including myopia plus astigmatism) and averaging for both eyes.

No. of Diopters	*No. of Cases*
6	6
7	11
8	1
9	9
10	8
11	4
12	9
13	3
14	3
15	3
16	0
17	2

ANALYSIS OF THE TEN CASES OF HYPEROPIA

RIGHT EYE *Sphere*	LEFT EYE *Sphere*
6	6
8	7
7	7
8	9
8	8
4.50 4 cyl.	4 4 cyl.
12	13
12	13
8	8
8	9

Assuming that the refractions are correct, it is of interest in connection with the myopes to note that but 26 were purely myopic. There was also a tendency for the total amount of refraction to be about equal in either eye. The same tendency appears in the hyperopes. I could discover but two cases in which more than one member of a family was enrolled in sight-saving

classes. In one instance there were two children, and in the other three children of the same family having a high degree of myopia.

It would have been of interest to tabulate the visual acuity in relation to the degree of ametropia or degree of lens required. This it was impossible to do, as the time allowed for finishing the work was limited. It was casually noted, however, that there was no special relation between the amount of vision and the number of diopters of lens required. Asthenopia symptoms also bore no relationship to the extent of defect. It seems a strange fact that marked symptoms of asthenopia were lacking in most cases among children. This stands out in contrast to similar conditions among adults. If asthenopia were present more often, it might be a means of provoking parents to seek treatment. It is also noteworthy that most of these children are not conscious of the small amount of visual acuity they possess. The absence of asthenopia may be explained by the fact that children, especially when vision is poor, do not concentrate on close work for long periods.

Retinochoroiditis was the diagnosis made in eleven cases that showed marked changes in these tissues, seemingly of a permanent character. Low grades of the defect were frequently observed, but were not assigned as the chief factor causing semiblindness.

The six cases of optic atrophy showed marked changes in color of the disk and in the character

of the vessels. Vision in each case was reduced to 20/200 or less. One child gave a history of a serious injury to the forehead, four had been under antiluetic treatment, and one gave no definite history.

Congenital amaurosis was diagnosed in fifteen cases after a consideration of the history obtainable and inability to find sufficient evidence in the eyes to warrant a more specific listing. Nystagmus of many varieties was prevalent in practically all of these cases. Both eyes were affected to almost the same degree and there seemed to be no opportunity to improve vision by refraction.

Most of the twelve congenital-cataract cases had been unsuccessfully operated upon at some previous time. The pseudoglioma case had recently had the eye enucleated.

The study of the ages of the children at the time of survey showed nothing of importance. There were 135 from ten to fourteen years old. A similar study of ages at the time of entering sight-saving classes was made of 136 of the pupils.

Report cards of 138 of the children showed that 133 were born in America, four in Russia, and one in Canada. About 65 per cent were children of American parents, and the others chiefly Italian and Russian.

AGES OF PUPILS AT THE TIME THEY ENTERED SIGHT-SAVING CLASSES

Age Groups	5½-6	6-6½	6½-7	7-7½	7½-8	8-8½	8½-9
No. Pupils Enrolled in Each Group	3	5	11	6	1	14	6

Age Groups	9-9½	9½-10	10-10½	10½-11	11-11½
No. Pupils Enrolled in Each Group	18	4	14	13	9

Age Groups	11½-12	12-12½	12½-13	13-13½	13½-14
No. Pupils Enrolled in Each Group	4	5	10	7	1

Age Groups	14-14½	14½-15	15-15½	15½-16	16-16½
No. Pupils Enrolled in Each Group	2	1	1		1

Total 136

The following investigation was made in an endeavor to learn the amount of mental retardation due possibly to the physical handicap of poor vision. An entire class of sight-saving pupils were given complete psychologic tests, including school proficiency, language development, memory span and performance tests, and the mental age and intelligence quotient were recorded by Binet tests. These tests were made by the supervisor of mental examinations of the department of special education. There were eleven children in the class, and none were found to be considerably retarded and only three were recorded below their mental age.

Without going into details of the organization and conduct of special classes for the semi-blind, a few facts should be explained: The number of children assigned to a class is ten to twelve. Specially trained and qualified teachers are employed, and are paid a slight increase over usual salaries. The classes are not ungraded but multigraded, and require individual instruction. Equipment comprises special seating, lighting, and study material. Books are printed in extra large "clear point" type.

Classes are conducted in schools where regular classes are also in session. It would seem advisable not to segregate or separate the special-class children entirely from the others. They should attend regular classes at times when the work does not require the use of the eyes. Oral and manual work should predominate in the special roster. Open-air exercises should be offered at intervals.

Corneal-opacity cases and many of the congenital defectives are not harmed by some close work, and should be in separate classes from the myopes. This arrangement would improve the teaching by permitting more group and less individual instruction.

The pitiful cases are those who are borderline for institutions. They have too little vision to benefit from special classes, and sufficient vision remaining to be refused by institutions for the blind.

The number of children in the special classes

who are wearing ill-fitting or badly twisted spectacle frames prompts the suggestion for periodic visits of an optician.

The survey seems to have brought out several factors that should dominate any plans for conservation of vision.

Of the 171 cases of semiblind enrolled in special classes, together with the 84 found in the canvass of the city, 63, or almost one-fourth of the total, show congenital defects and are not amenable to conservation; 72 show corneal opacities; and 76 show high degrees of myopia. It seems logical to reason that, with the exception of the myopes, little conservation of vision can be expected from special educational methods. The congenital defects and the opacities are undoubtedly benefited scholastically in special classes. The opacities become a purely medical problem for treatment until they arrive at a stage when the experienced oculist has pronounced them beyond improvement.

Conservation of vision should concentrate not on the few hopeless semiblind but on the vast army of children who have varying amounts of defective vision due to uncorrected ametropia. From this horde are later recruited many men and women who fill our clinics for nervous, stomach, and other diseases. It is the group of partly visioned children that add to the list of injured as well as to those responsible for many accidents. The amount of stunted progress and

inefficiency resulting from the failure to have visual defects corrected is incalculable.

In conclusion, it may be advisable to offer a few suggestions on important problems that require and deserve consideration by ophthalmologists:

(1) The formulation of admission standards for sight-saving classes. Physical defects, amount of loss of visual acuity, and ocular lesions that necessitate special and restricted education should be standardized.

(2) Should oculists alone be responsible for the diagnosis and placement of pupils?

(3) There is need of specialized medical advice on equipment and conduct of sight-saving classes. This should include the curriculum, and should emphasize hygiene of the eyes.

(4) Medical supervision should be by ophthalmologists.

(5) If special legislation for sight conservation is needed, its character and formulation should receive the attention and advice of the members who comprise the eye section of the State Medical Society.

(6) Most important is the need for an organized campaign to educate parents to the urgent need of early correction of defective vision due to errors of refraction.